

3211-01

What is claimed is:

1. A fuel composition, comprising:

(a) a diesel fuel;

(b) ethanol; and

(c) a surfactant comprising

(1) a hydrocarbylphenol or derivative thereof that is a Mannich base or an alkoxyated Mannich base;

(2) a reaction product of a hydrocarbyl-substituted polycarboxylic acid or anhydride and an alcohol, an amine, an amino alcohol, an epoxide, or a mixture thereof; or

(4) a mixture thereof

wherein the hydrocarbyl substituent of components (c)(1) and (c)(2) contains 4 to 20 carbon atoms; the ethanol comprises anhydrous ethanol containing up to about 0.1% by weight water, fuel grade ethanol containing up to 0.1% by weight water, or mixtures thereof; the diesel fuel is present at 50 to 99% by weight; the ethanol is present at 0.5 to 25% by weight; and the surfactant is present at 0.1 to 8% by weight and has a HLB value ranging from -30 to 20.

2. The fuel composition of claim 1 wherein the surfactant (c) further comprises at least one member selected from the group consisting of an alcohol, an alkoxyated alcohol, a fatty monocarboxylic acid or derivative thereof, and an alkoxyated hydrocarbylphenol.

3. The fuel composition of claim 2 wherein the diesel fuel contains aromatic hydrocarbons from 3 to 60% by volume, and the HLB value of the surfactant is directly proportional to the aromatic content of the diesel fuel.

4. The fuel composition of claim 2 wherein the derivative of the fatty monocarboxylic acid is an ester, an amide, an amine salt, a hydroxyalkyl-substituted amide, an aminoalkyl-substituted ester, an alkoxyated acid, or a mixture thereof.

5. The fuel composition of claim 2, further comprising:

(d) a combustion improver.

6. The fuel composition of claim 5 wherein the combustion improver comprises an inorganic nitrate salt, a hydroxylamine compound, an organic nitro compound, a compound having at least one strained ring group containing 3 to 5 ring atoms, or a mixture thereof.

7. The fuel composition of claim 1 wherein the surfactant comprises the Mannich base, the alkoxyated Mannich base, or a mixture thereof.
8. The fuel composition of claim 7 wherein the Mannich base is prepared by the Mannich reaction of a hydrocarbylphenol, an aldehyde, and an amine.
9. The fuel composition of claim 8 wherein the Mannich base is the reaction product of dodecylphenol, formaldehyde, and diethanolamine.
10. The fuel composition of claim 1 wherein component (c)(2) is the reaction product of an alkenylsuccinic anhydride and a tertiary amino alcohol.
11. The fuel composition of claim 1 wherein the diesel fuel comprises a middle distillate fuel, a Fischer-Tropsch fuel, a biodiesel fuel, or mixtures thereof.
12. The fuel composition of claim 5 wherein the diesel fuel is present at 55 to 99% by weight, the surfactant is present at 0.3 to 7% by weight, and the combustion improver is present at 0.005 to 10% by weight.
13. A method of operating a compression-ignited internal combustion engine, comprising:
 - fueling the engine with the fuel composition of claim 1.
14. The method of claim 13 wherein the surfactant (c) further comprises at least one member selected from the group consisting of an alcohol, an alkoxyated alcohol, a fatty monocarboxylic acid or derivative thereof, and an alkoxyated hydrocarbylphenol.
15. The method of claim 13 wherein the fuel composition further comprises (d) a combustion improver.
16. A method of providing performance advantages to a compression-ignited internal combustion engine, comprising:
 - fueling the engine with the fuel composition of claim 1.
17. The method of claim 16 wherein the fuel composition further comprises (d) a combustion improver.